



**Darwin Initiative, Darwin Plus and
Illegal Wildlife Trade Challenge Fund
Covid-19 Rapid Response Round - Final Report**

Due within two months of the end date of the Rapid Response Round project

(maximum 6 pages)

Project reference	CV19RR18
If linked with an ongoing project, please include that project reference here (e.g. IWT001)	26-018 Promoting public health in a biodiverse agroforest landscape in Guinea Bissau
Project title	Reducing transmission of SARS-CoV-2 to African great apes in tourism
Country/ies	Guinea Bissau, Uganda
Lead organisation	University of Exeter
Partner institution(s)	Conservation Through Public Health (CTPH), Uganda Institute for Biodiversity and Protected Areas (IBAP), Guinea Bissau Robert Koch Institute (RKI), Germany Bristol Zoological Society (BZS), UK IUCN Primate Specialist Group COVID-19 Working Group (not partner but offer full support)
Start/end date of project	01.01.2021 – 31.03.2021
Which fund was this project relevant to?	Darwin Initiative, Covid-19 Rapid Response Round
Grant value (£)	58,852.00
Project Leader name	Dr. Kimberley Hockings
Report author(s) and date	PL Kimberley Hockings and DPO Chloe Chesney wrote the report with contributions from project partners.28.05.2021.

1. Project Summary

All African great ape species - bonobos, chimpanzees, eastern gorillas and western gorillas - are listed as either Endangered or Critically Endangered on the IUCN Red List of Threatened Species, with all sub-species, except the mountain gorilla, declining. Great ape tourism occurs in at least 13 of 21 great ape range countries in Sub-Saharan Africa (Fig. 1a) and can assist conservation efforts through the provision of economic benefits. However, the health risks of tourism to great apes are well documented, with human respiratory viruses a main cause of death. To date there are no documented cases of SARS-CoV-2 infection in wild apes, likely due to an immediate cessation of tourism and research; however, captive gorillas have been infected and molecular evidence suggests all great apes are highly susceptible to the virus. With mounting pressure to resume tourism, evidence-based strategies are urgently required to prevent SARS-CoV-2 and other infectious disease transmission to great apes and neighbouring local communities.

Great ape tourism sites vary widely in the visitors they receive, and their practices to minimise disease transmission to apes. The effectiveness of any disease prevention strategy will depend on tourist understanding of risks, and compliance with regulations, as well as enforcement by tourism guides and authorities. The development of regulations and effective communication of those regulations requires a strong evidence base that must be adapted depending on the site context. A systematic and evidence-based approach across great ape tourism sites is currently lacking but is crucial to prevent the spread of infectious disease, including SARS-CoV-2, to vulnerable ape populations. This project is linked to: Darwin Initiative project 26-018 Promoting public health in a biodiverse agroforest landscape.

This project quantifies perception of risk, sense of responsibility, social norms, expectations, and willingness to adopt SARS-CoV-2 mitigation measures by tourists and guides to prevent transmission to African great apes and local communities. From this, we have developed evidence-based, multi-media educational material for ape tourism sites across Africa. Tourism education campaigns have been implemented for chimpanzees at Cantanhez NP, Guinea-Bissau (Fig. 1b), and gorillas at Bwindi Impenetrable NP, Uganda (Fig. 1c).

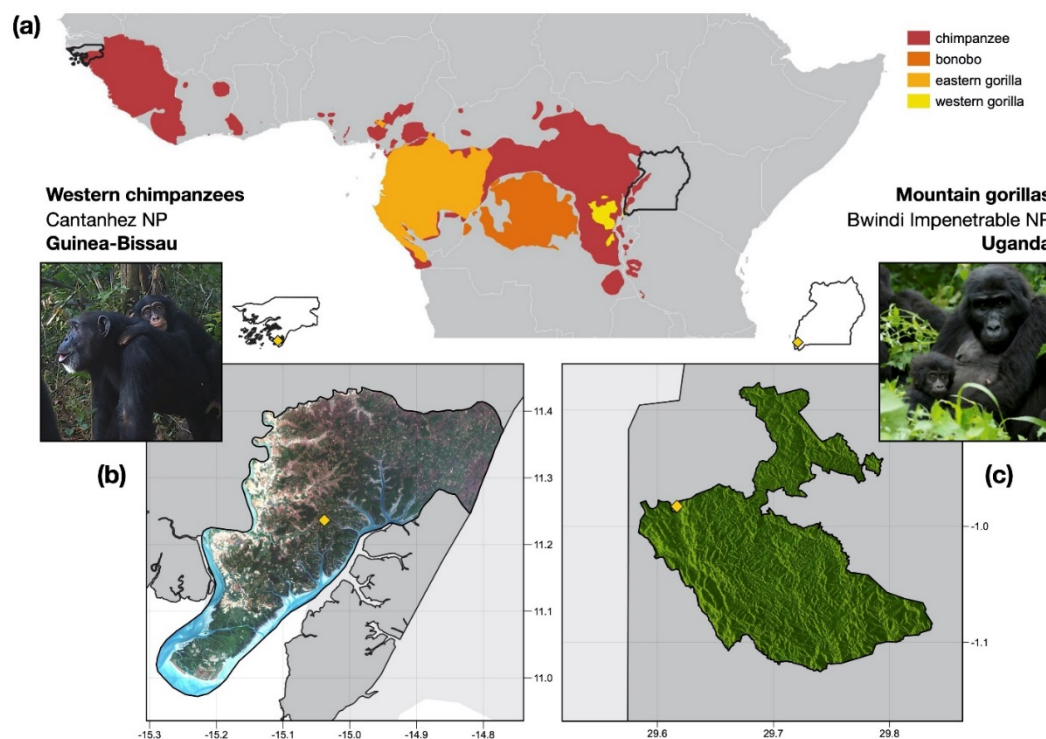


Fig. 1 (a) The range of all great ape species and sub-species across Africa. Of the 21 African great ape range countries, the following 13 countries have tourism with wild apes: Guinea-Bissau; Uganda; Central African Republic; Congo; Democratic Republic of Congo; Côte d'Ivoire; Gabon; Guinea; Liberia; Rwanda; Senegal; Sierra Leone; Tanzania. Eight countries currently have no known great ape tourism, including Angola (Cabinda); Burundi; Cameroon; Equatorial Guinea; Ghana; Mali, Nigeria; South Sudan. (b) A tourism education campaign will be implemented for Critically Endangered western chimpanzees (*Pan troglodytes verus*) at Cantanhez NP, Guinea-

Bissau (c) A tourism education campaign will be implemented for Endangered mountain gorillas (*Gorilla beringei beringei*) at Bwindi Impenetrable NP, Uganda.

2. Project Achievements

Project Outcome: Increased protection from SARS-CoV-2 to great apes and local communities, improved capacity to resume tourism safely, and enhanced coordination between sites to mitigate disease transmission risks in 13 African countries.

Summary of all Work Undertaken:

Objective 1: To determine perception of risk, sense of responsibility, social norms, expectations, and willingness to adopt disease mitigation measures by tourists and guides.

Online Questionnaire: Between 19th January and 22nd February 2021, we collected data through an online questionnaire that was available in English, French, German, Italian, Mandarin, Portuguese and Spanish (Evidence 1). Combining questions on demographic characteristics, past tourism experiences, potential tourist behaviour, perceived effectiveness of measures, perceptions of risk and impact, and management recommendations, we aimed to explore factors that affect willingness to follow best practise (and thus inform the design of the "Protect Great Apes from Disease" education materials). The online questionnaire was distributed via mailing lists, professional networks and social media channels to encompass a range of sectors (including conservation and tourism), and geographical locations. Our survey link was clicked on over 10,000 times (measure of reach), and we surpassed our aim of 1000 online questionnaire responses with 1020 participants from 58 countries, and strong female representation (71% female: 28% male). 54 participants reported African nationalities and a further 45 participants reported African residencies. We produced a report (Evidence 2) and are currently writing up these findings "Understanding perceived risk and norms to reduce the risk of anthroponotic disease transmission in great ape tourism" for submission to a peer-reviewed journal.

Semi-structured interviews with potential tourists: Between 9th February and 15th March 2021, 24 follow-up interviews with online questionnaire participants were held over Zoom by DPO to further investigate potential barriers to adoption of SARS-CoV-2 disease mitigation strategies and how they would best receive the education materials. Participants were selected systematically to best represent the demography and travel experience of the online questionnaire participants. Each interview lasted around one-hour and were transcribed by the DPO (Evidence 3). To save time, we stopped conducting interviews when confident that there were no new points being raised by interviewees.

Structured interviews with tourism guides: Between 17th February and 30th March 2021, we assessed 45 guides (8 Female: Male 37) pre-training knowledge of disease risk and mitigation measures in great ape tourism surpassing the proposed number of 28 guides from two sites in the application (Evidence 4). Structured in-person interviews were conducted by project partners (following disease-safe best practice measures) from Bwindi Impenetrable National Park (Uganda, N=22) (Evidence 5) and Cantanhez National Park (Guinea Bissau, N=11) (Evidence 6) as proposed in the application. We extended data collection to additional tourism sites in Africa including Western Area Peninsula National Park (Sierra Leone, N=8), Mahale Mountain National Park (Tanzania, N=1) and Nouabalé-Ndoki National Park (Republic of Congo, N=3).

Workshop to present research findings & discuss education design and strategy: To maximise engagement with this project and to promote uptake of the education materials, we invited great ape tourism stakeholders to attend a workshop with the following aims (i) to present and discuss findings from the questionnaire and interview data collected, and (ii) to present our initial ideas of how this might be integrated into educational material i.e. type, design, content, and messaging (Evidence 7). Participants included members of the IUCN working group on COVID-19 (who supported this funding application and have provided feedback on the questionnaire draft), international and national great ape conservation organisations, and research and tourist site directors and managers. On 3rd March 2021, we held one morning and one afternoon workshop (to ensure participation from different time zones) with each lasting 1 hour 30 minutes. In total, 31 people participated in the workshops (Evidence 8).

Objective 2: To use information generated in Objective 1 to develop an evidence-based suite of multi-media education materials that are available in multiple languages to inform tourists of best practices to prevent disease transmission to great apes.

Education Materials for Tourists have all been developed and comprise three main components, targeting international and national tourists: (1) An interactive website to provide information to tourists at all stages of their tourism experience including pre-travel; (2) Educational posters to convey key information once in-

country and at the trekking site; (3) Interactive tablet at the trekking site to provide the education material offline; and (4) Tourism guide training material. All education material follows IUCN great ape tourism disease mitigation best practice guidelines.

Website – The tourist section of the website www.protectgreatapesfromdisease.com is active (Evidence – please click on website link) and contains: (i) information that great apes are threatened with extinction and are at risk from human infectious disease; (ii) results from our online survey emphasising that we developed this material following feedback from tourists and other stakeholders; (iii) a 5-minute video presented by great ape disease experts explaining the importance of adhering to disease prevention measures (in English with subtitles in English, Portuguese, French, and Spanish subtitles); (iv) points for tourists to remember before international travel, during in-country travel, and whilst at the great ape trekking site; (v) a pledge tourists can take to show they will adhere to guidelines. In June 2021, we will hold a workshop with the IUCN COVID-19 group to decide on a strategy to promote/disseminate the website to potential tourists and tour operators. For Objective 1, we engaged with great ape tourism organisations from all African great ape range countries with active tourism as well as 64 tourism sites, surpassing our target of 7 countries and 20 sites (Evidence 9), and educational materials will be disseminated to these contacts. We will continue to update the website in line with IUCN and other international disease mitigation guidelines.

Posters – (Evidence 10) We have developed three tourist education posters, with versions for gorillas and chimpanzees. Posters are available in English, Portuguese, French and Spanish, as these were the main languages that guides identified as spoken by tourists. However, posters can be translated into additional languages if required. These posters will be freely available on a ‘tourism site manager’ section of the website (currently under construction). Tourism site managers are informed of the educational materials and will email the PL for copies. Additional Institutional logos can be added to the panel at the bottom of each poster to tailor the posters according to site requirements.

Poster 1 is to be displayed in the country where tourism occurs but not at the great ape trekking site – for example: airports, tourist hotspots such as hotels and restaurants and biodiversity headquarters. This poster informs tourists of the risks presented by great ape tourism, the symptoms that they should declare, and what they need to bring to the great ape trekking site.

Poster 2 is to be displayed at the great ape trekking site, for example at accommodation or restaurant areas, and at the site where the tourists receive a guide briefing. This poster ensures that all disease prevention measures are known, especially if tourists have not seen the website or Poster 1.

Poster 3 is to be displayed at the great ape trekking site where the tourists receive a guide briefing. This poster facilitates communication between guides and tourists, especially when language barriers exist. This poster will be included in guide training to facilitate its use as a communication resource.

Offline programme (interactive, multi-language, remote)

During data collection we identified a disparity in levels of organised tourism in East and West Africa. In East Africa, particularly Uganda and Tanzania, tourism is typically organised through tourism operators, whereas in West Africa tourists mostly travel to tourism sites independently. As tourists in West Africa are less likely to have been directed to our website by tour operators and to maximise their engagement with education materials, we programmed interactive tablets for use at three chimpanzee tourism sites in West Africa: Cantanhez National Park in Guinea-Bissau; Outamba Kilimi National Park in Sierra Leone; and Bossou and Nimba Biosphere Reserve in Guinea (Evidence 11). These tablets provide an offline, interactive, multi-lingual version of the website which will be supported by a tailored 3-minute video presented by an authoritative figure for great ape conservation in each country (Aissa Regalla for IBAP, Guinea-Bissau; Ali Gaspard Soumah for IREB in Guinea; Vickie Remoe and Dr. Arnold Okoni-Williams for Sierra Leone) (Evidence 12).

Guide training material

We developed guide training material that is freely available for use at all great ape tourism sites. This includes a Powerpoint presentation with a recommended script that great ape tourism sites can use to (i) provide information to guides on the ‘Protect Great Apes from Disease’ initiative across Africa; (ii) train guides in up-to-date health protocol; (iii) empower guides so they are confident to enforce the regulations; and (iv) direct guides on how to use the other education materials (Evidence 13). Once guides have completed the training, they receive a certificate (Evidence 14).

Objective 3: To effectively run evidence-based education campaigns at Cantanhez National Park and Bwindi Impenetrable National Park. To train all 108 tourist guides across these sites, and for the guides to demonstrate improved knowledge of SARS-CoV-2 and capacity to enforce regulations via pre- and post-training knowledge assessments. The data collected in this project (as detailed in Objective 1) was used

to inform the development of the training material. From the 20-24th April, CTPH trained 152 guides and rangers across five sectors of Bwindi Impenetrable National Park. To demonstrate improved knowledge of infectious disease and capacity to enforce regulations, and for guides to complete training, they must be able to confidently deliver a pre-trek briefing including all disease mitigation measures as detailed during the training session. For the guides to receive a certificate of completion they must deliver a short speech using the education materials provided and demonstrate competence in dealing with a difficult scenario through role play. For example, a tourist refusing to wear their mask properly. All 152 guides and rangers at Bwindi completed their training and demonstrated improved knowledge and were awarded certificates. Training was also conducted with the 11 guides at Cantanhez using the same process of evaluation. All guides at Cantanhez completed their training and demonstrated improved knowledge and were awarded certificates (Evidence 15).

Additional work: On application of this funding there was abundant evidence that great apes were seriously at risk of becoming infected with SARS-CoV-2. However, no confirmed case of SARS-CoV-2 was recorded until January 2021 when a captive troop of eight western lowland gorillas (*Gorilla gorilla gorilla*) at the San Diego Zoo Wildlife Alliance tested positive through PCR tests. All eight gorillas exhibited intermittent clinical signs of mild to moderate respiratory illness except one older male gorilla who required treatment and supportive care for a full recovery. In January 2021, confirmation of SARS-CoV-2 infection in captive gorillas at the San Diego Zoo brought further attention to the importance of this project and the PL was invited to join the IUCN COVID-19 working group (see COVID-19 member list: <https://www.iucngreatapes.org/working-groups>) and also acted as external consultant for the IUCN's ARRC taskforce to mitigate impacts of a proposed great ape tourism project.

The PL and DPO met with Anna Behm Masozera from the International Gorilla Conservation Programme and Liz Williamson (IUCN Great Ape Specialist Group) on 24th March to discuss how this project, in particular the guide training tourist pledge, can be integrated with existing efforts to better regulate mountain gorilla tourism. We agreed on a mutually beneficial path to promote both initiatives that includes directing tourists to both websites.

CTPH project partner presented our work to the Association of Ugandan Tour Operators (Evidence 16) and during a University of Oxford Primate Conversations talk.

Plans are also underway to train tourism guides at additional sites, including Outamba Kilimi National Park and Western Area Peninsula National Park in Sierra Leone, and at Bossou and Nimba Biosphere Reserve in Guinea.

Problems encountered:

Following the workshop, we unanimously decided to include all infectious zoonotic diseases and not limit the project to solely SARS-CoV-2. It was agreed that this would avoid a problematic situation where tourists thought disease risk is absent once the COVID-19 pandemic is under control.

To address the common issue of diversifying online questionnaire participants we developed a strategy for questionnaire dissemination to reach people from diverse age, nationality, and education backgrounds, including African nationals. However, most participants were European or North American, and ideally, we would have identified a larger Asian audience for the online survey. Low representation was compounded by orangutans (the only Asian great ape) not being included in this short project.

Gender Equality:

We designed this project and all materials to be inclusive of gender and race. Five of 8 project staff and 3 of 5 project consultants are women. Four of 8 project staff are African nationals. In the online questionnaire more female (n=725) participants took part than male (n=287). No gender specific dissemination or promotion of the survey took place. For the semi-structured interviews, where participants were selected, gender balance was achieved with 11 female and 13 male participants. As most tourism guides are male, only 17% of the guides interviewed for this project were women; no gender-based discrimination took place in the selection process for participants.

Value for Money:

We prioritised cost effectiveness and efficiency for the budget, including sourcing materials and services locally wherever possible. This project secured matched funds from the PL (time and overheads) and project partners have made significant commitments in staff time and logistic costs. We have made value for money a priority and this extensively reduced funds sought from Darwin. This project made use of IBAP and CTPH vehicles to run guide questionnaires and educational activities. These are cost effective as we employ Guinean and Ugandan staff with appropriate pay scales with capacity building benefits.

Effectiveness of Partnerships:

A fundamental part of this project is the consolidation of a multi-stakeholder, cross-disciplinary multi-institutional collaborative approach to promote evidence-based conservation and great ape health across tropical Africa. Maintaining and strengthening the collaborative environment for project partners and external Organisations including the IUCN has been crucial for the success of this project. We have held regular meetings with project partners to ensure effective communication and engagement at all stages of the project.

Safeguarding and ethical considerations:

Data collection was approved by the Ethics Committee of the University of Exeter (Ref. eCORN002530 v3.1) and followed best international practices recommended by the British Psychology Society. All guide questionnaire and education activities were conducted by IBAP and CTPH, located in-country. All procedures complied with National and UK legislation. Each questionnaire respondent gave their consent and participation was voluntary. Any information/identifying records collected will remain anonymous. Data will be stored securely, following University of Exeter policy. There were no safeguarding issues.

Project contributions towards the wider aims of Darwin Initiative Fund:

Positive impacts on biodiversity conservation will be achieved by ensuring great apes, local communities and tourism guides are more resilient to infectious diseases including SARS-CoV-2, through strengthening tourism disease outbreak mitigation rules are strengthening the communication of guidelines and codes of practise. The website will act as a forum to encourage strengthened collaboration between great ape sites and communication between visitors and great ape experts, as well as the communication of updates and new information for tourists, guides, and great ape tourism managers.

Lessons learnt and recommendations:

Despite achieving more than we proposed in the application, in retrospect we were overly ambitious for a three-month project, which stretched the whole team in terms of workloads, especially as the UK was in lockdown. A six-month period would have been more appropriate. We recommend that applicants should avoid the temptation to propose too many activities in such a short period of time. If the project was longer than 3 months, post-training capacity could have been more thoroughly evaluated.